

PATENT SPECIFICATION



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COMPLETE SPECIFICATION.

Improvements relating to Protecting the Interior of an Oil Cracking Retort.

I, ALBERT CHARLES HOLZAPFEL, a citizen of the United States of America, of Avenue House, Sheldon Avenue, Hampstead Lane, London, N. 6, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to a process of and composition for protecting the interiors of oil cracking retorts or cylinders.

Oil cracking processes by which gasoline and other light petroleum hydrocarbons are obtained from heavier petroleum oils are very destructive to the retorts, stills, cylinders or the like in which the cracking operation is carried out, the metal rapidly becoming corroded or eaten away whereby the life of the retort or the like is shortened and the purity of the cracked products diminished.

Many attempts heretofore have been made to protect the interiors of retorts for cracking oils to prevent such acid and other corrosion but without any substantial degree of success owing, it is believed, to the nature of the materials treated therein and the high temperatures used.

Such temperatures are destructive of practically all known paint materials which would, in any case, be dissolved and removed by the gasoline and other light petroleum products in the retorts. The use of steam in connection with "cracking" would moreover remove any so-called "water paints", which might stand the temperatures of 900° F. and upwards, under which cracking processes are carried out.

Now I have discovered that retorts for cracking can be protected to a very substantial and practically advantageous extent by applying to the interior thereof a coating comprising a mixture of ordinary commercial water glass, water and powdered solid alkaline earth (including magnesia) or compound of alkaline earth, as for example alkaline earth carbonate, and preferably

magnesite and slaked lime, and one or more powdered inert refractory mineral substances preferably fire clay, to which may advantageously be added a pigment which is inert under the conditions obtaining in oil cracking retorts, preferably powdered titanium oxide which is both heat- and acid-proof and substantially insoluble in the light and heavy petroleum products with which it comes into contact in the retort.

I prefer to use a composition containing the following materials in the proportions indicated:

Commercial water glass	-	-	45 parts by weight	
Water	-	-	28 parts by weight	70
Magnesite	-	-	5 parts by weight	
Slaked lime	-	-	2 parts by weight	
Fire clay	-	-	10 parts by weight	

If a pigment is used I prefer to use powdered titanium oxide in the proportion of 10 parts by weight to 90 parts by weight of the preferred mixture set forth.

The magnesite may be used without the slaked lime and the lime without the magnesite with some measure of success but I prefer to use both magnesite and lime.

The fire clay may be omitted and other refractory inert mineral powder substituted therefor and fairly satisfactory results obtained but I have obtained the best results by using fire clay in association with the other preferred ingredients.

The proportions of the ingredients may be widely varied. I may with some measure of success use the water glass and water in proportions of from 25 to 75 per cent. by weight of the former to 75 to 25 per cent. by weight of the latter and the other ingredients in widely varying proportions. However, by using all of the ingredients mentioned and in substantially the proportions indicated, I have obtained the most satisfactory results.

The preferred composition hereinbefore set forth is in the form of a paint adapted to be applied to the interior of oil-cracking retorts in any of the ways in which paint is applied to surfaces to be coated therewith.

The composition should be applied promptly, and preferably immediately, after it has been prepared as the constituents tend to thicken and finally to harden.

5 In using my composition in retorts not before treated therewith I prefer to apply successively two or more coats, applying the second coat as soon as the first has dried or set, the same being done in the case of the third coat if a third coat is applied. I prefer to apply one coat every two or three weeks. Oil-cracking retorts ordinarily are opened every two or three weeks and the later repair coats can advantageously be applied at such times. Before the renewal or repair coats are applied the surface to be renewed or repaired should be thoroughly cleaned as by brushing it vigorously with a steel wire broom to remove all foreign matter which has been deposited on the steel surface of the interior of the retort.

10 In some cases I have obtained particularly satisfactory results by first applying three successive coats of my composition to the interior surfaces of retorts not previously treated according to my process and then applying to the surface of the outer coat a temporary water-proofing coating preferably a thin coating of a heavy mineral oil. This oil coating serves to protect the coating beneath it for the short time it is subjected to the contact of the materials used in cracking operations before the coating has been raised to the high temperature (around 900 or 1000° F.) used in cracking oils and which temperature is necessary to make the steel protecting qualities of my composition thoroughly effective. In its green or unheated condition my composition is materially less resistant to attack by the material coming into contact therewith than in its finished or indurated condition.

15 Ordinarily, however, it is not necessary to apply the temporary water-proofing oil coating, particularly if my preferred composition is used, as such composition offers considerable resistance to the water, steam or other materials coming into contact therewith even before it is transformed into the final

condition by the heat to which it is subjected during the oil-cracking operation.

My composition is adhesive to the steel surfaces of the oil-cracking retorts, is substantially insoluble in light and heavy petroleum hydrocarbons and their vapours and in water and steam even in the presence of acid and not only withstands temperatures around 900° and 1000° F. but is indurated and improved by being heated to such temperatures.

10 I am aware of Specifications Nos. 5291 of 1895 and 15,057 of 1904 and I do not claim anything which is described therein, my invention being limited to the protection of the interior surface of oil-cracking retorts.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A process of protecting the interior surface of oil-cracking retorts by applying thereto a composition comprising water glass, water, a powdered solid alkaline earth (including magnesia), or compound of alkaline earth, and one or more powdered inert refractory mineral substances, and subjecting the coating to an oil-cracking temperature.

2. A process as referred to in Claim 1, wherein the composition comprises powdered magnesite, slaked lime and powdered fire clay.

3. A process as referred to in either of the preceding claims, wherein the composition comprises titanium oxide.

4. A composition for protecting the interior surface of oil-cracking retorts comprising commercial water-glass, water, powdered magnesite, slaked lime, and fire clay substantially in the proportions herein named.

5. A composition for protecting the interior surface of oil-cracking retorts as referred to in Claim 4 together with 10 parts by weight of titanium oxide.

Dated this 30th day of April, 1927.

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